MAIN FACTORS TO ENCOURAGE SWITCH TO PUBLIC TRANSPORT SYSTEM; TRIPOLI-LIBYA

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ABSTRACT

Increasing the private vehicles namely own car, taxi, microbuses and coaches as a mode of transport is due to its inherent advantages associated with its usage. In Tripoli due to rapid increase in private vehicles usage associated with no public transport system namely public buses and train has resulted in increase of traffic congestion problem, accidents and inadequate of parking spaces. The objective of this study which identify the factors encourage users of own car and private vehicles to shifting to public transport system. Re-establish of public transport system and decreasing own car users simultaneously has become necessary for solving traffic congestion problems and reduces road accidents and travel time for all trips. A questionnaire survey was carried out on users of private vehicles transport in the Tripoli such as car owners, passengers, taxis and microbuses drivers (n = 900). The probability of car drivers shifting to public transport was examined based on scenario several options such as reduction and improve in public transport travel time. Improve travel time by70% will be encourage switching about 82.3% to switch from use own car to use public transport system services. Logistic regression technique has been used to analyses the factor that impact users to switch their trips to public transportation system alternatives. Statistical Package for Social Science (SPSS) version 19 and Excel 2007 software were used to analysis the questionnaire in this study.
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Keyword: Improve travel time, reduction traffic congestion, public transport, road safety

INTRODUCTION

Tripoli is biggest Libyan city and is the country's capital. Tripoli Population is 1,682,000 people with covered area of 400 square kilometres and population density 2207.32 people / sq km (Libya country Profile –2007, 2008). The Tripoli city was growing very fast for the last ten years, both economically and administratively. More and more policies and regulations are being developed at Tripoli level, particularly in the field of traffic and transport. The free movement of people, goods and services is a key priority of the Tripoli city. The continuing growth in vehicle ownership, lack of car parking spaces and stopped public transport service in latest of eighties, most streets of Tripoli road network started

to suffer from various traffic congestion problems. The number of vehicles increased approximately to 898707 vehicles, at peak period from 7 am to 7pm, there is continual congestion; traffic congestion is frequently a problem through weekdays (Traffic office and licensing of Tripoli, data as of 2008).

This paper is a part of the study that focused on model shift initiatives. These initiatives focused on shifting private cars users to safer modes of public transport system in order to increase road safety and enhance road environment. There are many cities have attempted to restrict to use of own cars in favour of public transport, such as policies exist in Malaysia (Kamba et al. 2007), Dublin (Transportation 21 2005), Dubai (Almannaei & Mehmood 2005), Egypt (El-Shourbagy 2003), Saudi Arabia (Abdul Jalil 1401), Lebanon (Lebanon state of the Environment report 2001), England (Harrison et al. 1998), Romania (Marshall & Mclellan 1998), France (Harrison et al. 1998) and Asian countries (Land Transport Authority, LTA 1996). The attempts have been by changing the public perception to it. This study shows the differences in the characteristics of current transport modes namely microbus, coaches, taxi and own car users, travel time present the hypotheses testing as relation between own car users and public transport system modes to provided safety road service and avoid road accidents risk.

METHODOLOGY

The survey was carried out in selected roads in Tripoli where there were higher private vehicles available. The survey was done used questionnaire to get relevant data. The respondents for this survey are the private vehicle users and riders at study areas who use their vehicles to make all their trips to work, study and shopping. The respondents selected randomly. A total of 900 questionnaires were collected in 5 months from (25 July to 23 December 2009). The questions addressing private vehicles users and riders were addressed contained only in the revealed preference survey and pertained to demographic, socioeconomic characteristics and mode attributes. The respondents were requested to report their current travel situation by answering a set of questions. Statistical Package for Social Science (SPSS) and Microsoft Excel 2007 software were used to analysis the questionnaire and Logistic regression model was developed for public transport alternatives namely, public bus and train, with the core of comparing the utility of these travel modes and to identify the factors that would affect cars users to switching from travelling by cars to choosing the public transport system alternative option by suitable travel time and safety trip.

RESULT AND DISCUSSION

Reasons convince to switch from using own car to Public Transport

The table 1 shows the reasons convince to a mode shift from private vehicles travel to public transport system, it is very important to understand the factors, which encourage the great majority of own car and taxi users to shift to public transport system namely public bus and train as a regular means of transport. The

factors of most significance encouraging private vehicles users to using the public transport system was that the high traffic congestion and delay. This statement received an average rating of 1) 27.7 % if the PT service is available, 2) 6.3 % if the PT fare is cheap, 3) 20.7 % if the PT service is fast, 4) 24.3 % if the PT covered all desirable routes, and 5) 21 % if the PT vehicles are clean and comfortable.

TABLE 1 Reasons can convince to switch from using own car to public transport

No	Statement	Percent
1	If the service is available	27.7
2	If the fare is cheap	6.3
3	If the service is fast	20.7
4	If the desirable routes are covered by public transport	24.3
5	If the vehicles are clean and comfortable	21.0

Improving the Travel Time for the Public Transport system

The main factor affect decision making in choosing travel mode from, in and to Tripoli is travel time. Using Public transport system services is perceived as a waste of time by almost all private vehicles users. Figure 2 represents travel time reduction of fifty percent which allowed switch to use public transport by (45%) of respondents and a time reduction of seventy percent will be prefer to switch for use public transport by (81.2%) of respondents.

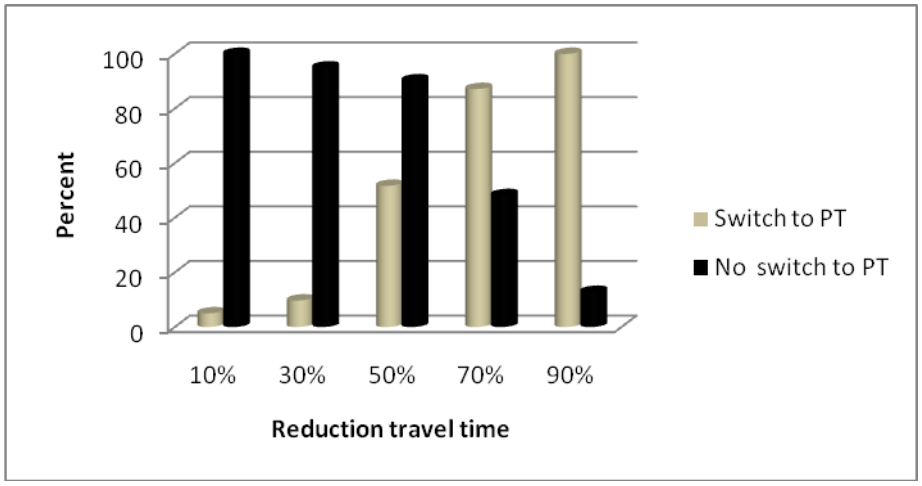

FIGURE 2 Switching to PT if the travel time improved

Table 2 below shows improve travel time with respect to survey result and probability of prediction (P) values. P value is derived from Equation 1 which involve constant and alpha (α) values to verify the logistic prediction model used in this study.

$$P = 1 / 1 + De^{\alpha(\text{variable})} \quad (1)$$

Where P = Probability prediction, D = constant, α = coefficient of x_i

TABLE 2 Survey results and data calibration

Travelling Time Reduction	Survey Results (P)	(1-P)/P	Ln(1-P)/P
10 %	0.05	19	2.944438979
30 %	0.047	20.2766	3.009467512
50 %	0.42	1.3809	0.322735461
70 %	0.357	1.8011	0.588397589
90 %	0.127	6.874	1.927746178

The results of above table reflect the model calibration process which then uses to develop the Analysis of Variance (ANOVA) table. By using the alpha (α) and (D) values from ANOVA table, our model achieved the value of P equal to 0.00205 which somehow acceptable to be significant (significant value is <0.05) as shown in Equation 2.

$$L_n D = 3.178015$$
$$\alpha = -7.0902$$
$$D = 23.99907$$

Thus, $$P= 1/1+23.99907e^{-7.0902 \text{ (variable)}} \quad (2)$$

The result of the prediction models can be shown in Table 3 and Fig. 3

TABLE 3 Survey results and logit model results

Travel time reduction	Survey results (P)	Result from logit model
10%	0.05	0.056067143
30%	0.047	0.054951998
50%	0.42	0.450133494
70%	0.357	0.343707878
90%	0.127	0.092998585

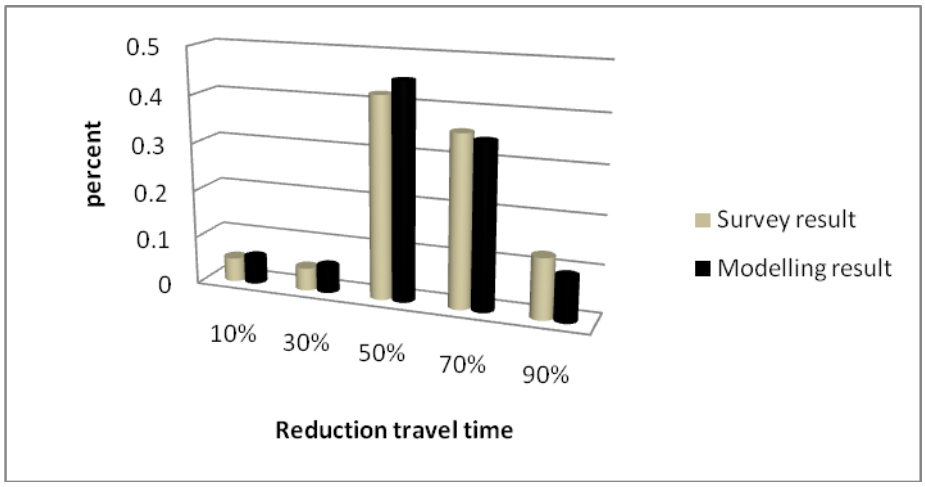

FIGURE 3 Improving travel time for public transport

Majority of Tripoli residents are suffering from the daily congestion in most city streets especially at peak period of working days (Saturday through Thursday).

Table 4 shows in 263 Tripoli residents out of 300 respodents or 87.7% of the respondents prefer to use public transport to avoid traffic congestion.

TABLE 4 Use public transport or prefer your own car

Statement	Frequency	Percent
Yes, use public transport	263	87.7
No, prefer use own car	37	12.3

The best public transport mode use in Tripoli

Table 5 shows the 39.7% of the respondents prefer to use buses in city streets while, 24% like to use light rail transit, 23.3% for train and low percent about 13.0% prefer to use public taxi.

TABLE 5 The best public transport mode use in Tripoli

Statement	Frequency	percent
Buses	119	39.7
Light Rail Transit	72	24.0
Underground Train	70	23.3
Public Taxi	39	13.0

The Model examined the influential attributes for car users, taxi and microbus users relative to public transport (PT) use. It was found that the estimated coefficient on travel time was significant.

CONCLUSION

Private vehicles are an important thing in Libyan people daily life to make their daily trips easier. But, the total of private vehicles on road were increased which cause many traffic congestion problems such as time delay of trip, road accidents, traffic noise, air pollution and else. Reduce of travel time by using public transport mode will be encourage to switch. Switching to public transport system alternatives options could decrease the congestion and increase road safety. Poor public transportation services especially public buses at certain places in Tripoli city is the reason why travellers prefer to use private vehicles. The development and enhancement of public transport (PT) mode in providing good travel time and providing of parking services such as providing park and ride facilities will be encourage car users' mode shift. The current mode split is 80% use own car and 20% whose use the public transport namely taxi, coaches and micro bus. The result shows if improve the public transport travel time will be encourage the 82.3% to switch from use own car to use public transport services, that mean reduce traffic congestion, road risks and provided suitable trip travel time. The need of realignment the Public Transport system namely Buses for example Bus Rapid Transit (BRT), Light Rail Transit and Heavy Train is very important to relieve the traffic problem on Tripoli roads and streets.

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REFERENCES

Libya country Profile – Published 13 November 2007, last update 21 September 2008.

Traffic office and licensing of Tripoli (2007) and (2008).

Kamba A. N., Riza Atig O,K Rahmat &Amiruddin Ismail. 2007. *Why Do People use Their Cars: A Case Study In Malaysia*. Journal of Social Sciences 3(3):117-122.

Transportation 21. 2005: *Future for Dublin A policy Paper* by the Dublin Chamber of Commerce 10th January 2005.

Almannaei Ghaya Adam, Mehmood Arif: *Analyzing the impact of Traffic Congestion Solution on Road Safety.* A case of Emirates and Sheik Zayed Road in Dubai (2005).

El-Shourbagy Mahmoud 2003. *Traffic Analysis on Main Corridors in Mansoura City*, Dakahlia Governieate, Egypt, King Saud University, Civil Eng. Department, college of Eng (2003).

Abdul Jalil. *Statistical Analysis of the Number of Traffic Accident in Saudi Arabia*. Paper Presented to symposium Studies Traffic in Big Cities. Security Academy of Naif 1401.

Lebanon state of the Environment report, Ministry of Environment / LEDO, Chapter 5 pages from 65 – 83 (2001).

Harrison, S, Henderson, G, Humphreys, E & Smyth, A. 1998. *Quality bus corridors and green routes: can the achieve a public perception of permanence of bus services*? In Proceedings of the PTRC 26th European Transport Conference: Public Transport and Operation, 14-18 September 1998, Loughborough University, UK

Marshall,S & McLellan, A. 1998. *Reducing the need to travel:* a European guide to good practice in proceedings of PTRC 26th European transport Conference: policy, planning and Sustainability: 14-18 Sept. Loughborough University, UK

Land transport Authority LTA, 1996. *A world class land transport system*' white paper presented to Parliament, 2 January 1996